REMARKS

Claims 1 and 3-9 were pending in this application, with claims 2 and 10-14 having previously been canceled, without prejudice or disclaimer. By this Amendment, claim 4 has been canceled, without prejudice or disclaimer, and claims 1 and 5-8 have been amended to address formal issues and clarify the claimed subject matter, without introducing new matter and new issues. Entry of the Amendment is requested. Claims 1, 3 and 5-9 would remain pending upon entry of this Amendment, with claim 1 being the sole pending claim in independent form.

Claims 1 and 3-9 were objected to as purportedly having informalities. Claim 4 was objected to under 37 C.F.R. § 1.75(c) as purportedly in improper dependent form. Claims 1 and 3-9 were rejected under 35 U.S.C. §112, second paragraph, as allegedly indefinite. Claim 7 was rejected under 35 U.S.C. §112, second paragraph, as allegedly omitting essential elements.

In response, the claims have been amended to address formal issues referenced in the Office Action.

Withdrawal of the objections to the claims and the rejections under 35 U.S.C. §112, second paragraph, is respectfully requested.

Claims 1, 3 and 7-9 were rejected under 35 U.S.C. § 103(a) as purportedly unpatentable over Wang et al., "Half-Scan Cone-Beam X-ray Microtomography Formula", (1993) Scanning, Volume 16, Pages 216-220, in view of Tam '112 (US 5,390,112). Claim 4 was rejected under 35 U.S.C. § 103(a) as purportedly unpatentable over Wang in view of Tam '112 and further in view of Suparta, "Focusing Computed Tomography", (2000) 15th WCNDT Roma 2000. Claim 5 was rejected under 35 U.S.C. § 103(a) as purportedly unpatentable over Wang in view of Tam '112 and further in view of Lin (US 5,047,931). Claim 6 was rejected under 35 U.S.C. § 103(a) as purportedly unpatentable over Wang in view of Tam '112 and further in view of Lin and Turbell,

"Cone-Beam Reconstruction Using Filtered Backprojection", (February 2001) Linkoping Studies in Science and Technology dissertation No. 672. Claims 1 and 3 were rejected under 35 U.S.C. § 103(a) as purportedly unpatentable over Tam 1999, "Backprojection spiral scan region-of-interest cone beam CT", (1999) SPIE, Volume 3661, Pages 433-441 in view of Tam '112.

Applicant respectfully submits that the present application is allowable over the cited art, for at least the reason that the cited art does not disclose or suggest the aspects of the present application that the reconfiguration means determines, ***for each voxel***, a projection data phase range as an angle between 180 and 360 degrees from projection data obtained at a spiral orbit scan so that a difference in absolute values of cone angles at both ends of the projection data phase range used is ***minimized***.

In such aspects, as discussed in the present application, for example, at paragraph [0160], a maximum cone angle of the beam used for back projection can be minimized, and as a result, a width of the detector in the go-around axis (z) direction can be reduced, and thus measuring throughput can be improved. Applicant found that when a tomographic image is reconstructed in X-ray tomography, an optimum reconstructed image can be obtained if a cone angle of beam used for back projection is ± 0 degrees. For example, in Fig. 5B, the beam having a cone angle of ± 0 degrees corresponds to a beam irradiated directly underneath from the radiation source 11 to a portion between the fourth and fifth radiation detectors 13b. If a tomographic image is reconstructed using data obtained from only the beam having a cone angle of ± 0 degrees, a substantially improved image can be reconstructed. The above-mentioned aspects is directed to an approach wherein a minimal cone angle is calculated for each voxel.

Wang, as understood by applicant, proposes a half-scan cone-beam reconstruction approach for an x-ray shadow projection microtomographic system using a scannable point

source, wherein a transaxial slice is reconstructed using projection data collected from an approximately 180° angular range plus two fan-angles (half scan).

However, in the approach proposed in Wang, the same back projection phase is used for all voxels, as in conventional approaches (see paragraph [0160] of the present application). In Wang, the z-direction positions of the focuses of parallel beams are not the same in the channel direction (see half-scan cone-beam reconstruction formula proposed in Wang wherein longitudinal coordinate z is variable), so that a maximum cone angle back projected at each voxel increases. Thus, a wider detector is required depending on the go-around axis (z) direction and measuring throughput deteriorates.

Wang, contrary to the contention in the Office Action, simply does NOT disclose or suggest the aspects of the present application that the reconfiguration means determines, ***for each voxel***, a projection data phase range as an angle between 180 and 360 degrees from projection data obtained at a spiral orbit scan so that a difference in absolute values of cone angles at both ends of the projection data phase range used is ***minimized***.

Tam '112 (US 5,390,112), as understood by applicant, references a conventional configuration, as shown in Fig. 1A of Tam '112, of scanning and data acquisition in a computerized tomography (CT) system employing cone beam geometry, wherein field of view 10 (a cylinder radially centered on axis 12) encloses an object to be imaged, a suitable cone beam energy source 14 and a two dimensional array detector 16 cooperate along a defined source scanning trajectory to provide cone beam projection data. The relative motion between source 14 and the object may be accomplished by moving source 14 while the object in field of view 10 remains stationary, moving the object while source 14 is stationary, or by moving both the object and source 14 at the same time.

On the other hand, Tam '112 proposes an approach for cone beam scanning and data acquisition for three-dimensional computerized tomography imaging, wherein a source scanning trajectory takes the form of a helical path located on a cylindrical surface which surrounds a field of view that contains the object being imaged, and area detectors thus can have a dimensions that are substantially smaller than the corresponding dimension of the object being imaged, as shown in Fig. 2 of Tam '112.

However, Tam '112, like Wang, proposes an approach wherein the same back projection phase is used for all voxels.

Tam 1999 ("Backprojection spiral scan region-of-interest cone beam CT", SPIE, Volume 3661, Pages 433-441), as understood by applicant, a spiral scan cone beam reconstruction approach in which image reconstruction proceeds via backprojection in the object space, wherein the projection data is restricted by a masking process (the mask consists of a top curve and a bottom curve formed by projecting the spiral turn above and the turn below from the current source position) to the appropriate angular range required by data combination.

However, applicant finds no disclosure or suggestion in Tam 1999 (nor in any of the other cited references) of the above-mentioned aspects of the present application that the projection data phase range is determined for each voxel from projection data obtained at a spiral orbit scan so that a difference in absolute vales of cone angles at both ends of the projection data phase range used is minimized.

Applicant submits that the cited art, even when considered along with common sense and common knowledge to one skilled in the art, does ***NOT*** render unpatentable the above-mentioned aspects of the present application.

Accordingly, applicant respectfully submits that independent claim 1 and the claims

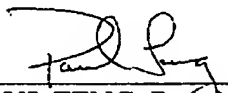
depending therefrom are allowable over the cited art.

In view of the remarks hereinabove, applicant submits that the application is allowable. Accordingly, applicant earnestly solicits the allowance of the application.

If a petition for an extension of time is required to make this response timely, this paper should be considered to be such petition. The Patent Office is hereby authorized to charge any required fees, and to credit any overpayment, to our Deposit Account No. 03-3125.

If a telephone interview could advance the prosecution of this application, the Examiner is respectfully requested to call the undersigned attorney.

Respectfully submitted,



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